

WHAT IS CLAIMED IS:

1. A sustained release oral solid dosage form comprising:
an therapeutically effective amount of a medicament having a solubility of
more than about 10 g/l;
a pH modifying agent;
a sustained release matrix comprising a gelling agent, said gelling agent
comprising a heteropolysaccharide gum and a homopolysaccharide gum capable of cross-
linking said heteropolysaccharide gum when exposed to an environmental fluid, said dosage
form providing a sustained release of said medicament after oral administration to human
patients.

2. The sustained release oral solid dosage form of claim 1 which provides a sustained
release of said medicament for at least about 12 hours after oral administration.

3. The sustained release oral solid dosage form of claim 1 which provides a sustained
release of said medicament for at least about 24 hours after oral administration.

4. The sustained release oral solid dosage form of claim 1, wherein said medicament has
a solubility of more than about 100 g/l.

5. The sustained release oral solid dosage form of claim 1, wherein said medicament has
a solubility of more than about 1000 g/l.

6. The sustained release oral solid dosage form of claim 1, further comprising an inert
pharmaceutical diluent.

7. The sustained release oral solid dosage form of claim 6, wherein said inert diluent is
selected from the group consisting of monosaccharide, a disaccharide, a polyhydric alcohol,
and mixtures thereof.

8. The sustained release oral solid dosage form of claim 6, wherein the ratio of said inert

diluent to said gelling agent is from about 1:3 to about 3:1

9. The sustained release oral solid dosage form of claim 1, wherein the ratio of said medicament to said gelling agent is from about 1:5 to about 5:1.

10. The sustained release oral solid dosage form of claim 1, further comprising an ionizable gel strength enhancing agent capable of crosslinking with said gelling agent and increasing the gel strength when the dosage form is exposed to an environmental fluid.

11. The oral solid dosage form of claim 10, wherein said ionizable gel strength enhancing agent comprises an alkali metal or an alkaline earth metal sulfate, chloride, borate, bromide, citrate, acetate, or lactate.

12. The oral solid dosage form of claim 11, wherein said ionizable gel strength enhancing comprises calcium sulfate.

13. The oral solid dosage form of claim 1, wherein said heteropolysaccharide gum comprises xanthan gum and said homopolysaccharide gum comprises locust bean gum.

14. The oral solid dosage form of claim 1, wherein said pH modifying agent is an organic acid.

15. The sustained release oral solid dosage form of claim 14, wherein said organic acid is selected from the group consisting of citric acid, succinic acid, fumaric acid, malic acid, maleic acid, glutaric acid, lactic acid and combinations thereof.

16. The sustained release oral solid dosage form of claim 15, wherein said organic acid is fumaric acid.

17. The oral solid dosage form of claim 1, wherein said pH modifying agent is present in an amount from about 1% to about 10%.

18. The oral solid dosage form of claim 1, further comprising a surfactant.
19. The oral solid dosage form of claim 18, wherein said surfactant is selected from the group consisting of anionic surfactants, cationic surfactants, amphoteric (amphipathic/amphophilic) surfactants, and non-ionic surfactants.
20. The oral solid dosage form of claim 18, wherein said surfactant is selected from the group consisting of sodium lauryl sulfate and a pharmaceutically effective salt of docusate.
21. The oral solid dosage form of claim 1, wherein said sustained release matrix further comprises a hydrophobic material.
22. The oral solid dosage form of claim 21, wherein said hydrophobic material is selected from the group consisting of an alkylcellulose, a copolymer of acrylic and methacrylic acid esters, waxes, shellac, zein, hydrogenated vegetable oil, and mixtures thereof, in an amount effective to slow the hydration of said gelling agent when exposed to an environmental fluid.
23. The oral solid dosage form of claim 21, wherein said hydrophobic material is ethylcellulose.
24. The oral solid dosage form of claim 5, wherein said sustained release matrix comprises from about 1 to about 20% by weight of said hydrophobic material.
25. The oral solid dosage form of claim 1, further comprising from about 1 to about 10% by weight microcrystalline cellulose.
26. The oral solid dosage form of claim 1, wherein said medicament is a benzothiazine.
27. The oral solid dosage form of claim 26, wherein said benzothiazine is diltiazem or a pharmaceutically effective salt thereof.

28. The oral solid dosage form of claim 27, which provides a sustained release of said diltiazem for at least about 12 hours after oral administration to human patients.

29. The oral solid dosage form of claim 28 wherein said diltiazem is present in an amount from about 60 mg to about 120 mg.

30. The oral solid dosage form of claim 27, which provides a sustained release of said diltiazem for at least about 24 hours after oral administration to human patients.

31. The oral solid dosage form of claim 30 wherein said diltiazem is present in an amount from about 120 mg to about 300 mg.

32. The oral solid dosage form of claim 1, wherein said medicament is an antispasmodic agent.

33. The oral solid dosage form of claim 32, wherein said antispasmodic drug is oxybutynin or a pharmaceutically acceptable salt thereof.

34. The oral solid dosage form of claim 33, wherein said antispasmodic agent is oxybutynin chloride.

35. The oral solid dosage form of claim 33, which provides a sustained release of said oxybutynin for at least 12 hours after oral administration to human patients.

36. The oral solid dosage form of claim 35, wherein said oxybutynin is present in an amount from about 2.5 mg to about 25 mg.

37. The oral solid dosage form of claim 33, which provides a sustained release of said oxybutynin for at least about 24 hours after oral administration to human patients.

38. The oral solid dosage form of claim 37, wherein said oxybutynin is present in an

amount from about 5 mg to about 50 mg.

39. The oral solid dosage form of claim 1 which is a tablet.
40. The oral solid dosage form of claim 1 which is in granular form.
41. The oral solid dosage form of claim 40, wherein a portion of said medicament is outside the granulation.
42. The oral solid dosage form of claim 40, wherein a sufficient amount of said granules to provide an effective dose of said medicament are disposed in a pharmaceutically acceptable capsule.
43. The oral solid dosage form of claim 39 wherein at least part of a surface of said tablet is coated with a hydrophobic material to a weight gain from about 1 to about 20 percent, by weight.
44. The oral solid dosage form of claim 43, wherein said hydrophobic material is selected from the group consisting of an alkylcellulose, a copolymer of acrylic and methacrylic acid, waxes, shellac, zein, hydrogenated vegetable oils, and mixtures of any of the foregoing.
45. The sustained release oral dosage form of claim 18 which provides bimodal absorption profile of said medicament.
46. A sustained release oral solid dosage form comprising:
 - an effective amount of a calcium channel blocker to provide a therapeutic effect, said calcium channel blocker having a solubility greater than 10 g/L;
 - a pH modifying agent;
 - a pharmaceutically acceptable surfactant
 - a sustained release excipient comprising a gelling agent, said gelling agent comprising a heteropolysaccharide gum and a homopolysaccharide gum capable of cross-

linking said heteropolysaccharide gum when exposed to an environmental fluid, said dosage form providing bimodal absorption profile of said calcium channel blocker and providing a sustained release of said calcium channel blocker for at least about 12 hours after oral administration to human patients.

47. The oral solid dosage form of claim 46, wherein said calcium channel blocker is a benzothiazine.

48. The oral solid dosage form of claim 46, wherein said benzothiazine is diltiazem or a pharmaceutically acceptable salt thereof.

49. The oral solid dosage form of claim 48, wherein said dosage form provides an initial peak concentration ($C_{max} \#1$) of said diltiazem in about 4 to about 10 hours after oral administration of the dosage form, followed by a second peak concentration ($C_{max} \#2$) which occurs in about 10 to about 16 hours after oral administration of the dosage form, said dosage form providing a therapeutic effect for at least about 24 hours after oral administration to a human patient.

50. The dosage form of claim 49, wherein said time to first peak plasma concentration ($T_{max} \#1$) of diltiazem occurs in about 6 to about 8 hours after oral administration of the dosage form to the patient.

51. The dosage form of claim 49, wherein the maximum plasma concentration of diltiazem at the first T_{max} ($C_{max} \#1$) is from about 50 to about 100 ng/ml, per administration of a 240 mg dosage of diltiazem.

52. The dosage form of claim 46, wherein the second peak plasma concentration ($C_{max} \#2$) occurs in about 12 to about 14 hours after oral administration of the dosage form to the patient ($T_{max} \#2$).

53. The dosage form of claim 52, wherein the maximum plasma concentration of

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diltiazem at Cmax #2 is from about 60 to about 90 ng/ml, per 240 mg diltiazem.

54. The dosage form of claim 46, wherein the width of the plasma concentration curve at 50% of the height of Cmax #1, based on a trough taken as the Cmin between Cmax #1 and Cmax #2 is from about 0.5 to about 4.0 hours.

55. The dosage form of claim 46, wherein the width of the plasma concentration curve at 50% of the height of Cmax #1, based on a trough taken as the Cmin between Cmax #1 and Cmax #2 is from about 1 to about 3 hours.

56. The dosage form of claim 46, wherein the width of the plasma concentration curve at 50% of the height of Cmax #2, based on a the trough taken as the Cmin between Cmax #1 and Cmax #2 is from about 0.5 to about 8 hours.

57. The dosage form of claim 46, wherein the width of the plasma concentration curve at 50% of the height of Cmax #2, based on a the trough taken as the Cmin between Cmax #1 and Cmax #2 is from about 2 to about 6 hours.

58. The dosage form of claim 49, wherein the ratio of Cmax #1 to Cmax #2 is from about 0.5:1 to about 1.5:1.

59. The dosage form of claim 58, wherein the ratio of Cmax #1 to Cmax #2 is from about 0.7:1 to about 1.2:1.

60. A method of treating a human patient suffering from a disease state selected from the group consisting of hypertension, angina, aneurysms, arrhythmias, and headache comprising administering to said patient a dosage form of claim 46.

61. A sustained release oral solid dosage form comprising:
an effective amount of oxybutynin or a pharmaceutically acceptable salt thereof
to provide a therapeutic effect.

a pH modifying agent;

a sustained release excipient comprising a gelling agent, said gelling agent comprises a heteropolysaccharide gum and a homopolysaccharide gum capable of cross-linking said heteropolysaccharide gum, said dosage form providing a therapeutic effect for at least about 24 hours after administration to human patients.

62. The sustained release oral solid dosage form of claim 61 which provides a time to peak plasma concentration (Tmax) in about 5 to about 15 hours

63. The sustained release oral solid dosage form of claim 62 which provides a time to peak plasma concentration (Tmax) in about 8 to about 12 hours.

64. A method of treating a human patient suffering from incontinence comprising administering to said patient a dosage form of claim 61.

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